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A LEVEL MATHS

(6) Introduction to the Modulus Function

WORKING AT D/E

(1) $g(x) = |-x^2 - x|$

(a) Find $g(2)$ (b) Find $g(-1)$

(c) Write down the number of solutions to the equation $g(x) = -6$

(2) Sketch the graph of each showing where the line meets or crosses the coordinate axes.

(a) $y = |x|$ (b) $y = |x - 3|$ (c) $y = |2x - 1|$

(3) Find the two solutions to the equation $|3x - 1| = x + 2$.

WORKING AT B/C

(1) (a) Sketch the graphs of $y = |ax - b|$ where a and b are positive constants showing where the line meets or crosses the coordinate axes in terms of a and b .

(b) Show that the solution to the equation

$|ax - b| = 3$ can be written as $x = \frac{b \pm 3}{a}$

(2) (a) Solve the equation $|2x + 5| = 3 - x$

(b) Hence, solve the inequality $|2x + 5| < 3 - x$

(3) Solve the equation $|2x - 1| = |3 - x|$

WORKING AT A*/A

(1) There are no solutions to the equation

$$|4x - 1| = mx$$

where m is a constant. Write down the possible set of values of m.

(2) (a) The equation $|px + q| = r$ has two real solutions. Write down the set of values of the constant r.

(b) Sketch the graph of $y = |px + q| - r$ where $p > 0$, $r > 0$ and $q < 0$. Show where the graph meets or crosses the coordinate axes and the minimum point on the graph in terms of p, q and r.

(3) $f(x) = Ax^2 + Bx + C$ and $g(x) = a$

Find the maximum possible number of solutions to the equation $|f(x)| = g(x)$